AI Infrastructure: The Convergence of Data Centers and Electrification thesis

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Executive Summary

Artificial intelligence is driving one of the largest infrastructure investment cycles since the expansion of the internet. Unlike previous technology cycles, AI requires not only increasingly powerful semiconductors but also significant investment in physical infrastructure, including hyperscale data centers, high-speed networking, cooling systems, electrical equipment and reliable electricity generation. As AI workloads become more computationally intensive, the investment opportunity extends beyond digital infrastructure into the broader electrification of the economy.

The long-term investment outlook is supported by robust structural fundamentals. McKinsey and Statista indicate that global data-center capacity demand could increase massively by 2030, requiring trillions of dollars of investment. The International Energy Agency projects that electricity consumption from data centers could more than double by 2030, highlighting that electricity availability has become one of the principal constraints on AI deployment. Consequently, investment opportunities extend beyond data-center operators to companies supplying electrical infrastructure, cooling systems, networking equipment and power generation.

The selected portfolio reflects this integrated investment thesis by combining exposure across the AI infrastructure value chain.

Infrastructure Layer	**Company**
Electrical Infrastructure	Eaton
Cooling & Power Systems	Vertiv
Data Center Infrastructure	Equinix
AI networking	Arista Networks
Electricity Generation	Constellation Energy

Table 1: Data Center Infrastructure Layer Companies

To complement these individual holdings, the Global X U.S. Electrification ETF (WIRE) offers diversified exposure to the broader electrification theme through companies involved in electrical equipment, transmission, industrial automation and utilities. Collectively, these businesses exhibit attractive financial characteristics, including above-average revenue growth, expanding operating margins, strong free cash flow generation and durable competitive advantages.

Despite these favorable long-term fundamentals, investors should remain disciplined. Current valuations already reflect significant expectations for future AI adoption, while continued returns depend on sustained hyperscaler capital expenditure, timely expansion of electricity infrastructure and successful commercialization of AI applications. The

greatest investment risk is therefore not that AI fails to transform the economy, but that corporate earnings and cash flows grow more slowly than current market expectations imply. Portfolio construction should consequently emphasize high-quality businesses with pricing power, resilient cash generation and exposure to critical infrastructure bottlenecks rather than broad exposure to the sector.

Overall, the investment outlook remains constructive but valuation-sensitive. AI is expected to remain a multi-decade driver of digital infrastructure investment, while electrification has become the essential foundation enabling that growth. A diversified allocation across both themes provides exposure to the expansion of computing capacity and the modernization of the electrical grid, offering a balanced approach to capturing one of the most significant structural investment opportunities of the coming decade.

Market Opportunity

The expansion of artificial intelligence is driving a step-change in global data-center demand. At the same time, the increasing power density of AI workloads is transforming data centers into one of the fastest-growing sources of electricity consumption. The investment opportunity therefore extends beyond computing capacity into power generation, electrical distribution, cooling and grid infrastructure.

McKinsey estimates that data centers may require approximately $6.7 trillion of cumulative capital expenditure through 2030 to satisfy expected computing demand. Around $5.2 trillion could be associated with AI workloads, while approximately $1.5 trillion would support traditional computing applications. This spending will flow not only into servers, but also into networking, buildings, cooling, electrical systems and power infrastructure.

Another McKinsey study indicates that global data-center capacity demand will rise from approximately 82 GW in 2025 to 219–220 GW by 2030, representing annual growth of roughly 22%. AI workloads are expected to account for most of the incremental capacity, with AI-related demand reaching approximately 156 GW by the end of the decade.

The International Energy Agency projects that global data-center electricity consumption will reach approximately 945 TWh by 2030, more than twice its current level. Consumption is expected to grow by around 15% annually from 2024 to 2030, more than four times faster than electricity demand across the rest of the economy. Data centers would consequently account for just under 3% of global electricity consumption by the end of the decade.

Statista estimates that revenue in the Data Center market is forecasted to reach US$538.91bn in 2026. Network Infrastructure leads the market with a projected market

volume of US$284.01bn in 2026. An annual growth rate (CAGR 2026-2031) of 8.48% is expected to drive revenue to US$809.59bn by 2031.

Nearly 100 GW of new data centers will be added between 2026 and 2030, doubling global capacity. The global data center sector will likely expand at a 14% CAGR through 2030, which will require energy innovations to alleviate grid constraints. Hyperscalers will remain a key driver of sector growth, executing a dual strategy of leasing and self-building. By 2030, AI could represent half of all workloads with inference becoming the primary driver. AI only represented about a quarter of all data center workloads in 2025, with training driving most of the demand. However, a significant shift is anticipated in 2027, when inference workloads could overtake training as the dominant AI requirement. The sector is experiencing an infrastructure investment Supercycle requiring up to $3 trillion by 2030. Roughly 100 GW of new capacity is anticipated to come online between 2026 and 2030, equating to $1.2 trillion in real estate asset value creation. Tenants will likely spend an additional $1 to $2 trillion to fit out their space with IT equipment. (JLL)

Financial Performance and Valuation

Data Centers

Unlike many structural growth themes, the data center ecosystem combines high revenue growth with exceptional profitability and capital returns. The companies in this portfolio represent different parts of the value chain:

Eaton (Electrical Infrastructure): Acts as the foundational gatekeeper for power distribution. Its switchgear and power management systems are critical for handling the increased voltage required by AI clusters and stabilizing the interface between the utility grid and the data center.

Vertiv (Cooling & Power Systems): Solves the primary physical constraint of high-density computing. As AI workloads push rack power density beyond traditional limits, Vertiv's liquid cooling and uninterruptible power supply (UPS) systems prevent thermal throttling and operational downtime.

Equinix (Data Center Infrastructure): Provides the physical colocation real estate. Its carrier-neutral ecosystem generates highly predictable, recurring revenue through long-term leases and cross-connection fees, acting as a structural hedge against technology obsolescence.

Arista Networks (AI Networking): Resolves data throughput bottlenecks. Its high-bandwidth switching architectures allow thousands of clustered GPUs to communicate with ultra-low latency, maximizing the utilization rates of expensive semiconductor assets.

Constellation Energy (Electricity Generation): Anchors the physical power supply. By providing carbon-free, 24/7 nuclear baseload electricity, it fulfills hyperscalers simultaneous mandates for massive power capacity and strict corporate sustainability targets.

Company	Eaton	Vertiv	Equinix	Arista Networks	Constellation Energy
Revenue Growth	11%	27%	8%	20%	7%
Profitability Margin	25%	21%	29%	41%	24%
FCF margin	18%	19%	18%	38%	15%
Capex/Revenue	4%	3%	20%	2%	10%
Normalized P/E	30	42	85	40	30
Price/Sales	5.2	6.5	9.5	15	4.5

Table 2: Financial metrics

The companies selected for this portfolio exhibit a combination of characteristics rarely found within a single investment theme: above-average revenue growth, expanding profitability, strong free cash flow generation and high returns on capital. While they operate across different segments of the AI infrastructure value chain, they all benefit from the structural increase in data-center investment and the electrification required to support it.

Revenue growth remains robust across the portfolio. Vertiv and Arista Networks are expected to deliver the strongest growth, driven by rising demand for AI networking equipment and thermal management solutions. Eaton and Constellation Energy are expected to generate more moderate but durable growth as utilities, hyperscalers and industrial customers continue investing in electrical infrastructure. Equinix provides lower revenue growth but compensates through highly predictable recurring revenues and long-term customer contracts.

Profitability also distinguishes these businesses from many traditional industrial companies. Arista Networks generates operating margins exceeding 40%, reflecting its asset-light business model and strong competitive positioning within AI networking. Eaton and Vertiv have steadily expanded margins through operational improvements and pricing power, while Equinix benefits from high operating leverage once new data-center capacity is leased. Although Constellation Energy operates in a more regulated industry, its nuclear generation fleet provides stable cash flows and increasing pricing power as electricity demand rises.

Free cash flow generation remains another key strength. Most companies convert a significant proportion of earnings into cash, enabling continued investment without relying heavily on external financing. Capital intensity differs across the portfolio, however. Equinix requires substantial ongoing investment to expand its global data-center footprint, while

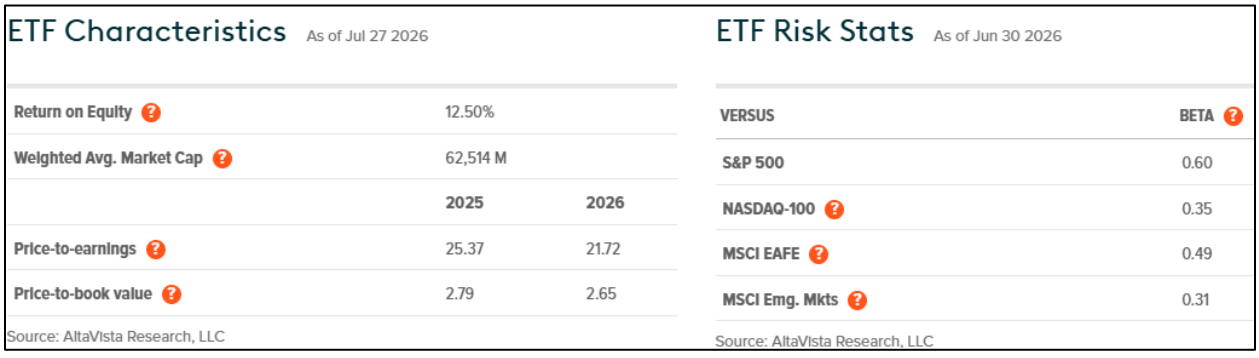
Constellation continues investing in generation assets and plant maintenance. In contrast, Arista operates with relatively low capital expenditure requirements, producing exceptionally high free cash flow margins. Eaton and Vertiv occupy the middle ground, combining industrial manufacturing with increasingly service-oriented and software-enabled revenue streams.

From a valuation perspective, investors are already assigning premium multiples to AI infrastructure companies. Arista Networks, Vertiv and Equinix trade well above historical market averages, reflecting expectations for sustained earnings growth. Eaton also commands a premium valuation due to its exposure to electrification and grid modernization, while Constellation Energy has benefited from renewed investor interest in nuclear power as a reliable source of carbon-free baseload electricity.

Overall, the portfolio demonstrates that the AI infrastructure investment case is supported not only by long-term growth expectations but also by strong underlying business fundamentals. These companies already generate attractive margins, robust cash flows and healthy balance sheets, suggesting that the sector's premium valuations are supported by genuine improvements in profitability and capital efficiency. Nevertheless, the elevated valuation multiples also imply that a significant portion of future growth expectations has already been incorporated into share prices, increasing sensitivity to any slowdown in AI-related capital expenditure or earnings growth.

Electrification

The Global X U.S. Electrification ETF (WIRE) provides diversified exposure to companies benefiting from the modernization of the electrical grid and the growing demand for electricity. Rather than relying on a single business model, the ETF includes manufacturers of electrical equipment, engineering firms, industrial automation companies, utilities and infrastructure providers. This makes it an appropriate proxy for evaluating the financial characteristics of the broader electrification theme.



ETF Characteristics As of Jul 27 2026

Return on Equity	12.50%	
Weighted Avg. Market Cap	62,514 M	
	2025	2026
Price-to-earnings	25.37	21.72
Price-to-book value	2.79	2.65

Source: AltaVista Research, LLC

ETF Risk Stats As of Jun 30 2026

VERSUS	BETA
S&P 500	0.60
NASDAQ-100	0.35
MSCI EAFE	0.49
MSCI Emg. Mkts	0.31

Source: AltaVista Research, LLC

Figure 1: ETF Characteristics and Risk Stats (Alta Vista Research)

Figure 1 highlights that the Global X U.S. Electrification ETF (WIRE) provides exposure to a portfolio of financially sound industrial and infrastructure companies. The ETF's weighted average return on equity of 12.5% indicates that its constituents generate attractive returns on shareholder capital while maintaining relatively conservative business models. Forward valuation metrics also suggest reasonable earnings growth expectations, with the forward price-to-earnings ratio declining from 25.4x in 2025 to 21.7x in 2026, reflecting analysts' expectations for earnings growth rather than multiple expansion alone. Likewise, the forward price-to-book ratio decreases modestly from 2.79x to 2.65x, suggesting that profitability is expected to improve over time while valuations become less demanding.

The ETF's risk characteristics further support its role as a complementary investment alongside AI infrastructure. With a beta of 0.60 relative to the S&P 500 and even lower betas versus the Nasdaq-100 (0.35) and international equity indices, the electrification theme has historically exhibited lower market sensitivity than many technology-focused investments. This reflects the defensive nature of many underlying holdings, including electrical equipment manufacturers, utilities and industrial infrastructure companies whose revenues are supported by long-term capital investment cycles. As AI accelerates electricity demand and grid modernization, WIRE offers diversified exposure to the infrastructure enabling this transition while potentially reducing overall portfolio volatility compared with a pure technology allocation.

The electrification sector combines characteristics of both industrial and infrastructure businesses. Unlike traditional industrial companies, many holdings benefit from long-term structural demand driven by grid modernization, renewable energy integration, electrification of transportation and, increasingly, AI data centers. This has translated into stronger revenue growth and expanding operating margins over recent years.

Electrification is not an independent investment theme, it is the enabling layer beneath AI infrastructure. Every additional megawatt of data-center capacity requires upgrades to transmission networks, substations, transformers, switchgear, cooling systems and reliable power generation. As AI workloads become increasingly energy intensive, electricity availability is emerging as the primary constraint on future data-center expansion.

Using WIRE as a proxy highlights this broader opportunity. Rather than investing only in individual companies, the ETF captures the full ecosystem of businesses that benefit from rising investment in electrical infrastructure. Together with Eaton, Vertiv, Equinix, Arista Networks and Constellation Energy, it complements the portfolio by providing diversified exposure to the backbone of the AI economy.

Key Risks

Although the long-term outlook for AI infrastructure and electrification remains compelling, investors should recognize that these sectors are not immune to cyclical downturns, execution risks and valuation pressures. While the structural drivers remain intact, the pace of investment and earnings growth is unlikely to follow a straight line.

AI Investment Cycle Slows

The current expansion is driven primarily by hyperscalers such as Microsoft, Amazon, Alphabet and Meta, which continue to invest heavily in AI infrastructure. Should enterprise AI adoption prove slower than expected, or if returns on AI investments fail to justify current capital expenditure levels, data-center investment could moderate after the current build-out cycle.

This would primarily affect companies exposed to networking equipment, cooling systems and data-center construction, including Arista Networks, Vertiv and Equinix. Although the long-term demand for digital infrastructure is expected to remain positive, revenue growth could become more cyclical than current market expectations imply.

Electricity and Grid Constraints

Ironically, one of the greatest opportunities also represents one of the largest risks. Data-center deployment is increasingly constrained by electricity availability rather than computing hardware. Delays in permitting, transmission expansion, substations, transformers and new power generation could postpone AI infrastructure projects despite strong demand.

While these constraints may slow the pace of data-center construction, they simultaneously reinforce the investment case for electrification. Companies supplying electrical equipment, grid infrastructure and reliable power generation including Eaton, Constellation Energy and the broader WIRE investment universe which are positioned to benefit from increased infrastructure spending required to remove these bottlenecks.

Premium Valuations

AI infrastructure has become one of the strongest-performing investment themes in recent years. As a result, many companies now trade at valuation multiples well above historical averages.

Investors are pricing in sustained double-digit earnings growth over many years. Should earnings growth normalize, valuation multiples could compress even if companies continue

to report healthy operational performance. This risk is particularly relevant for higher-growth businesses such as Arista Networks, Equinix and Vertiv, where expectations remain elevated.

Supply Chain and Execution Risk

Building modern AI data centers requires complex coordination across semiconductor manufacturers, networking providers, cooling equipment suppliers, utilities and construction companies. Shortages of transformers, switchgear, electrical equipment and skilled labor continue to extend project timelines in several regions.

Execution delays may temporarily reduce revenue growth and pressure margins across both the data-center and electrification value chains, particularly for companies involved in large infrastructure projects.

Regulatory and Energy Policy Risk

Government policy will play an increasingly important role in determining the pace of AI infrastructure deployment. Environmental permitting, electricity market regulation, nuclear policy and transmission approvals may accelerate or delay new investment.

Changes in energy policy could disproportionately affect utilities and power-generation companies, while stricter environmental standards or local opposition may slow the construction of new data centers.

Technological Disruption

Rapid innovation remains a defining characteristic of the AI industry. Improvements in semiconductor efficiency, liquid cooling, optical networking or future computing architectures may alter where value is created within the infrastructure stack.

Although total computing demand is expected to continue increasing, technological change could shift competitive advantages between equipment suppliers, networking providers and power infrastructure companies.

Overall Risk Assessment

The principal risks facing this investment thesis are largely cyclical and execution-related rather than structural. Artificial intelligence continues to drive unprecedented demand for computing infrastructure, while electrification has become an essential prerequisite for sustaining that growth. Consequently, even if hyperscaler capital expenditure moderates periodically, the long-term need for modernized electrical grids, reliable power generation and digital infrastructure is expected to persist.

Importantly, the portfolio is intentionally diversified across the AI infrastructure value chain. Equinix, Arista Networks and Vertiv provide exposure to digital infrastructure and computing capacity, while Eaton, Constellation Energy and the broader WIRE electrification universe benefit from the parallel expansion of electrical infrastructure. This diversification reduces dependence on any single technology or business model and strengthens the resilience of the overall investment thesis over the long term.

Scenario Analysis

Conservative Scenario

AI adoption continues but develops more slowly than current market expectations. Enterprises struggle to monetize generative AI, hyperscalers become more disciplined with capital expenditure, and improvements in chips, models and cooling reduce the electricity required per unit of computation. Statista's lower scenario of approximately $3.7 trillion would still represent substantial investment, but it would fall materially below McKinsey's central projection.

This scenario would place the greatest pressure on companies whose valuations assume sustained double-digit growth. Vertiv could experience weaker orders for high-density cooling and critical-power systems, while Arista could face slower AI-networking deployments. Equinix would likely remain supported by recurring revenue, but leasing growth and development returns could weaken.

The electrification exposure would provide partial protection. Eaton and WIRE are not dependent exclusively on data centers, they also benefit from ageing-grid replacement, renewable integration, industrial electrification and transportation. Electrification would therefore continue, although at a slower pace.

Moderate Scenario

The base case assumes that AI develops into a durable infrastructure cycle rather than a temporary investment surge. As mentioned in the chapters above, McKinsey estimates that global data-center capacity demand could rise to approximately 219–220 GW by 2030, supported by around $6.7 trillion of cumulative investment. Approximately $5.2 trillion of this spending could be associated with AI workloads.

Under the IEA's Base Case, global data-center electricity consumption rises from approximately 415 TWh in 2024 to around 945 TWh by 2030, before reaching roughly 1,200–1,300 TWh by 2035. Electricity consumption grows at about 15% annually through 2030, substantially faster than overall global electricity demand. (Appendix, Chart 1)

This is the most favorable balanced outcome for the portfolio. Arista and Vertiv benefit directly from expanding AI capacity, Equinix benefits from demand for interconnected and power-secured facilities, and Eaton, Constellation Energy and WIRE capture the necessary investment in electricity supply and distribution.

Optimistic Scenario

The bull case assumes that AI inference spreads rapidly across industries, model complexity continues to increase and efficiency improvements fail to offset growth in total computing demand. Cumulative data-center investment could approach the upper scenario estimate of approximately $7.9 trillion through 2030. (Statista)

The IEA's Lift-Off Case illustrates the scale of the potential electricity requirement: generation associated with data centers could approach 2,000 TWh by 2035, approximately 45% above its Base Case. Grid constraints would mean that renewables alone could not meet the increase, requiring additional natural gas, nuclear power, storage and transmission infrastructure. (Appendix, Chart 1)

This scenario creates the greatest upside across both sides of the thesis. Vertiv and Arista would benefit from faster infrastructure deployment, while electricity scarcity would increase the strategic value of Eaton's electrical equipment, Constellation's reliable nuclear generation and the broader WIRE portfolio. However, it would also increase the risk of project delays, cost inflation and regulatory intervention.

Investment Conclusion

The scenario analysis shows that electrification improves the resilience of the overall thesis. In the bear case, pure data-center suppliers face the greatest earnings and valuation risk, while grid-modernization exposure provides partial diversification. In the base and bull cases, electrification becomes increasingly important because power generation and transmission determine how quickly AI capacity can be deployed.

Investment Stance

The investment outlook for AI data centers and electrification remains constructive but valuation-sensitive. Structural demand is supported by rising AI workloads, cloud adoption, increasing data-center power density and the need to expand electricity generation and grid infrastructure. However, strong recent share-price performance means that a meaningful portion of the expected growth is already reflected in valuations, particularly among higher-growth equipment and networking companies.

The preferred approach is therefore selective rather than indiscriminate. Portfolio exposure should emphasize companies with durable competitive advantages, strong free-cash-flow generation, pricing power and positions in infrastructure bottlenecks. Data-center suppliers provide the highest operating leverage to continued hyperscaler investment, while electrical-equipment, power-generation and grid-infrastructure companies offer broader exposure to electrification beyond AI alone. This follows the same principle used in the attached AI brief: balance direct high-growth infrastructure exposure with more diversified businesses that can provide resilience if adoption or monetization develops more gradually.

The main near-term risk is not that demand for computing and electricity disappears, but that earnings growth fails to justify current multiples. A neutral-to-overweight stance is therefore appropriate for long-term investors, but new capital should be deployed gradually rather than through a single concentrated entry point.

Suggested Portfolio Positioning

Holding	Allocation
WIRE ETF	30%
Eaton	17.5%
Vertiv	17.5%
Equinix	15%
Arista Networks	10%
Constellation Energy	10%

Table 3: Suggested Portfolio Positioning

WIRE should operate as the portfolio's core holding. It provides diversified exposure to electrical equipment, utilities, engineering and grid infrastructure, reducing dependence on the execution of any one company. It also broadens the thesis beyond AI data centers to include industrial electrification, renewable integration, transmission investment and ageing-grid replacement.

Eaton and Vertiv should remain the largest individual positions. Both occupy critical bottlenecks within the data-center build-out. Eaton benefits from power distribution, switchgear and electrical-management demand, while Vertiv is more directly exposed to high-density cooling and critical-power infrastructure. Vertiv offers greater upside in an accelerated AI scenario but also carries greater downside if hyperscaler expenditure slows.

Equinix provides a more defensive form of data-center exposure. Its recurring colocation revenues, customer interconnections and established facilities offer greater earnings visibility than equipment suppliers, although its capital intensity and interest-rate sensitivity justify a slightly lower weight.

Arista should be held at a smaller weight despite its superior margins and cash generation. Its financial quality is exceptional, but its valuation, dependence on large cloud customers and exposure to rapid networking-technology changes increase the risk of multiple compression.

Constellation provides strategic exposure to the power-generation bottleneck. Reliable nuclear generation is increasingly valuable as hyperscalers seek large quantities of continuous, low-carbon electricity. Its smaller allocation reflects exposure to electricity prices, regulation and nuclear operating risks.

Appendix

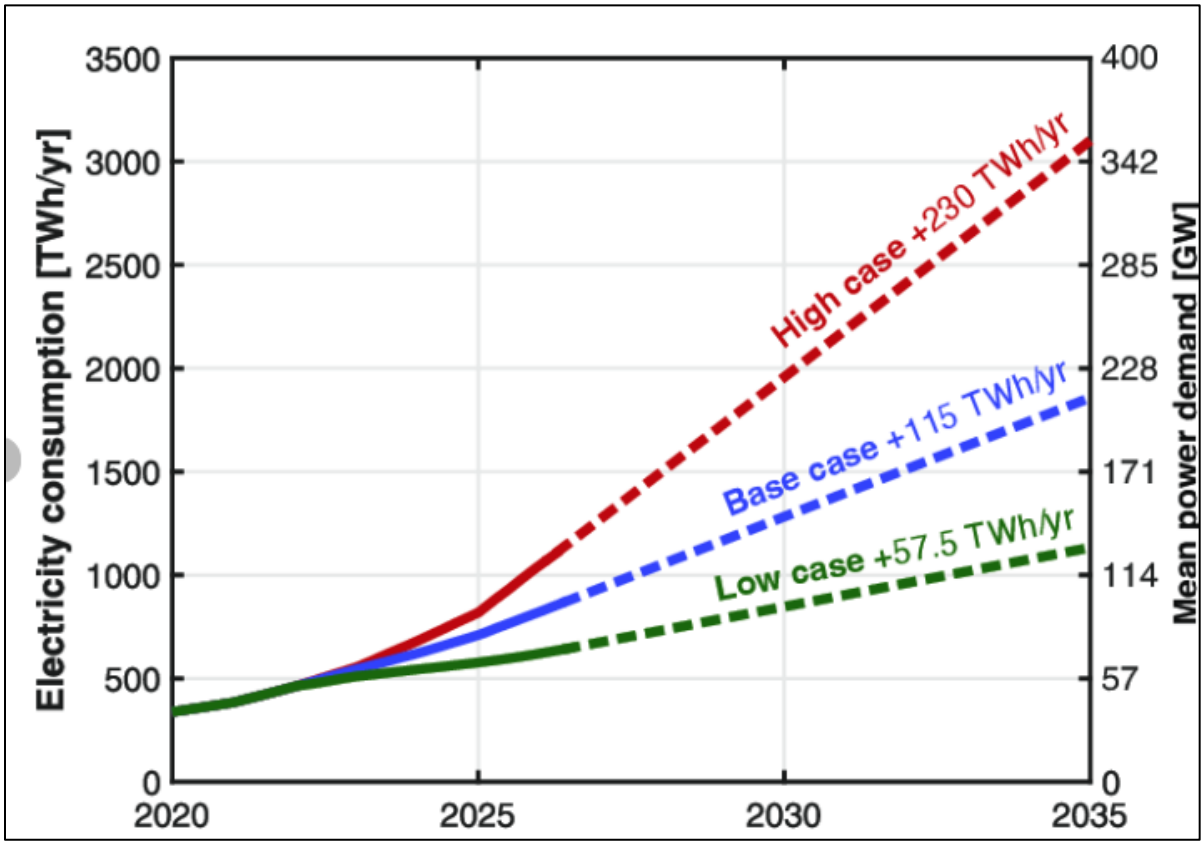


Chart 1: Electricity Consumption (IEA)